CLAIMS

1. A method for depositing particles onto a substrate, comprising:

providing a flow of a gas containing particles into a vacuum, the vacuum being configured to prevent the flow of the gas containing the particles from entering a deposition chamber coupled in flow communication with the vacuum without drawing any significant amount of air from the deposition chamber; and

diverting the flow of the gas containing the particles from the vacuum to the deposition chamber to cause particles to be deposited onto a substrate disposed in the deposition chamber.

2. The method of claim 1, wherein, after a desired amount of particles have been deposited onto the substrate, the method further comprises:

diverting the flow of the gas containing the particles from the deposition chamber to the vacuum.

3. The method of claim 1, wherein the operation of diverting the flow of the gas containing the particles from the vacuum to the deposition chamber includes:

interrupting the flow communication between the vacuum and the flow of the gas containing the particles.

4. The method of claim 1, wherein the flow to the vacuum matches or slightly exceeds the flow of the gas containing the particles into the deposition chamber.

5. A method for depositing particles onto a substrate, comprising:

providing a flow of gas containing particles along a flow path that bypasses a deposition chamber; and

changing the flow path of the flow of the gas containing the particles so that the flow of the gas containing the particles causes particles to be deposited onto a substrate disposed in the deposition chamber.

6. The method of claim 5, wherein, after a desired amount of particles have been deposited onto the substrate, the method further comprises:

changing the flow path of the flow of the gas containing the particles to the flow path that bypasses the deposition chamber.

7. A method for depositing particles onto a substrate, comprising:

disposing a substrate in a deposition chamber;

depositing particles onto the substrate in accordance with a first set of deposition parameters; and

without removing the substrate from the deposition chamber, depositing particles onto the substrate in accordance with a second set of deposition parameters.

8. The method of claim 7, wherein the first set of deposition parameters includes a first particle size and a first spot location for the deposition and the second set of deposition parameters includes the first particle size and a second spot location for the deposition.

9. The method of claim 7, wherein the first set of deposition parameters includes a first particle size and a first spot location for the deposition and the second set of deposition parameters includes a second particle size and a second spot location for the deposition.

10. A method for maintaining particle diameter during deposition of particles onto a substrate, comprising:

flowing gases into a differential mobility analyzer having a slit for passing particles therethrough, at least one of the gases flowing into the differential mobility analyzer containing particles;

monitoring the gas flows into and out of the differential mobility analyzer; and

periodically adjusting a voltage applied to the differential mobility analyzer so that a particle diameter passed through the slit remains substantially constant.

11. The method of claim 10, wherein the operation of monitoring the gas flows into and out of the differential mobility analyzer includes:

measuring a pressure differential across an orifice located before the differential mobility analyzer; and

measuring a pressure differential across an orifice located after the differential mobility analyzer.

12. A particle deposition system, comprising:

a deposition chamber having an inlet;

a conduit coupled to the inlet of the deposition chamber, the conduit being in flow communication with a source of gas containing particles, and the conduit having a first branch and a second branch;

a particle counter disposed in the first branch of the conduit;

an orifice disposed in the second branch of the conduit; and

a vacuum coupled in flow communication with the first branch of the conduit and the second branch of the conduit.

13. The system of claim 12, wherein the first branch of the conduit is closer to the source of gas containing particles than the second branch of the conduit.

14. The system of claim 12, further comprising:

a first solenoid disposed in the first branch of the conduit between the particle counter and the vacuum; and

a second solenoid disposed in the second branch of the conduit between the orifice and the vacuum.

15. The system of claim 14, further comprising:

an orifice disposed in the first branch of the conduit between the particle counter and the first solenoid.

16. The system of claim 12, wherein the source of the gas containing the particles is an atomizer.

17. The system of claim 16, further comprising a differential mobility analyzer in flow communication with the atomizer.

18. The system of claim 17, further comprising an orifice disposed before the differential mobility analyzer and an orifice disposed after the differential mobility analyzer.

19. The system of claim 18, further comprising a first pair of pressure sensors for measuring a pressure differential across the orifice disposed before the differential mobility analyzer and a second pair of pressure sensors for measuring a pressure differential across the orifice disposed after the differential mobility analyzer.

20. The system of claim 12, wherein the conduit has a third branch, the third branch being in flow communication with the vacuum.

21. The system of claim 20, further comprising:

an orifice disposed in the third branch of the conduit.

22. The system of claim 21, further comprising:

a third solenoid disposed in the third branch of the conduit between the orifice and the vacuum.

23. The system of claim 12, wherein the conduit is in flow communication with a source of makeup gas.

24. A particle deposition system, comprising:

an atomizer for providing a flow of gas containing particles;

a flow control device coupled in flow communication with the atomizer;

a differential mobility analyzer coupled in flow communication with the flow control device; and

a deposition chamber coupled in flow communication with the flow control device and the differential mobility analyzer, wherein when the particles in the flow of the gas containing the particles are to be filtered by the differential mobility analyzer, the flow control device directs the flow of the gas containing the particles toward the differential mobility analyzer, and when the particles in the flow of the gas containing the particles are not to be filtered by the differential mobility analyzer, the flow control device directs the flow of the gas containing the particles toward the deposition chamber.

25. The particle deposition system of claim 24, wherein the flow control device is a three-way solenoid.

26. The particle deposition system of claim 24, wherein when the particles in the flow of the gas containing the particles have a size that is not larger than 1.5 microns, the flow control device directs the flow of the gas containing the particles toward the differential mobility analyzer, and when the particles in the flow of the gas containing the particles have a size that is larger than 1.5 microns, the flow control device directs the flow of the gas containing the particles toward the deposition chamber.